

Clinical Profile of Neonatal Admission and Hospital Outcome in a Tertiary Care Hospital of Dhaka City

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Neonatal period is the most susceptible period of life due to different causes, which in most cases are preventable. This is a prospective observational study conducted in Sir Salimullah Medical College & Mitford Hospital, Dhaka over a period of one year from January to December 2015. The purpose of this study to identify the clinical profile, common causes of morbidity and hospital outcome of admitted neonates. Out of 518 neonates, 56.4% male, 66.4% term, 33.4% preterm, 58.3% normal birth weight, 40% low birth weight. Most of neonates (80.3%) admitted during first 24 hours of age. Cause of admission were respiratory distress, history of delayed cry or no cry after birth, preterm low birth weight, jaundice, convulsion, poor feeding, and lethargy. Major morbidities were perinatal asphyxia (50%), hypoxic ischemic encephalopathy (13.1%), low birth weight(40%), prematurity (33.4%), sepsis (25.6%), neonatal jaundice (26.4%). Hospital stay was less than 7 days in majority (87.1%) of neonates, 69.1% discharged, 13.5% left against medical advice, 3.4% absconded, 5.8% referred to other hospital facility. Total death was 8.1% (42/518). Major causes of death were perinatal asphyxia (54.7%), prematurity (57.1%) and sepsis(26.1%), 45.2 % of neonatal death occurred by 24 hours of age and 80.9% by first week of life. So it could be recommended that optimum care should be taken during pregnancy, around the time of birth, also in first week of neonatal period to prevent, also to reduce morbidity and mortality.

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Key words: Neonates, morbidity, outcome.

Introduction

Neonatal period, first 28 days of life is the most susceptible period of life due to different diseases, which in most of the cases are preventable by simple low cost intervention. Of the 6.3 million children who died before age 5 years in 2013, 44% (2.761 million) died in the neonatal period.¹ Among these neonatal death per year 98% occur in low-middle income countries.² The mean neonatal mortality rate across all birth 27.3per 1000 deliveries (range 8 to 41) in low and middle income countries, compared to 2 to 4 per 1000 live births in most high-income countries.³ More than half of all deaths occur within 24 hours of birth and 81% within first

week of life.³ In Bangladesh, neonatal death comprise 74% of infant deaths and 60% of under five children deaths.⁴ Around 85% of neonatal deaths were attributed to complications of preterm birth, infections and intrapartum-related causes ('birth asphyxia').⁵ But in industrialized countries deaths related to extreme prematurity and congenital abnormalities predominate.¹

This study was undertaken to identify the clinical profile, common causes of morbidity and hospital outcome of neonates admitted to level 2 neonatal care unit with limited facilities of a tertiary care hospital.

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Methods

This is a prospective observational study conducted in neonatal care unit (NCU -2) of Sir Salimullah Medical College & Mitford Hospital, Dhaka over a period of one year from January to December 2015. Total 518 babies admitted in NCU (unit 2) during study period. The diagnosis of birth asphyxia is based on history of delayed cry after birth, required resuscitation, Apgar score below 7 at five minutes, HIE categorized by Levene's clinical scoring.⁶ Diagnosis of sepsis is based on risk factors, clinical correlation and laboratory findings with existing facilities of hospital according to possible criteria's adopted from European Medicines Agency.⁷ Management was given according to unit protocol. Details information, clinical presentation, documented in neonatal history sheet at admission, morbidities and outcomes were recorded during hospital stay in the unit. Data were analyzed with SPSS 17.0.

Results

Over one year period total 518 neonates were admitted. Among them 56.4% male, 66.4% term, 33.6% preterm, 58.3% normal birth weight, 40% low birth weight (Table-I). Majority of mothers (77%) were between 20 to 30 years, 14.3% teenage mother, 48% primi, 53.7% required caesarean section. Mean gestational age 37.19 ± 2.9 (range 25 weeks to < 42 weeks) and mean birth weight 2453 ± 65 (range 500 gm to 4100 gm). Common clinical presentation at admission were history of delayed cry (37.8%) or no cry after birth(4%), preterm low birth weight(15.4%), convulsion (9%), neonatal jaundice (8.3%), poor feeding (8.7%), lethargy (5.6%), vomiting (5.4%), fever (5.4%), infant of diabetic mother (1.7%) (Table-II). Major morbidities were perinatal asphyxia (50%), hypoxic ischemic encephalopathy (13.1%), low birth weight (40%), prematurity (33.4%), sepsis (25.6%), neonatal jaundice (26.4%). Few others were

congenital malformations (2.9%) and birth trauma (2.3%). Out of 518 neonates, 480 (92.6%) admitted during first 72 hours of age, of these majority 80.3% (416) admitted by 24 hours of age. Hospital stay was less than 7 days in majority (87.1%) of neonates (Table-III). Most of neonates (69.1%) were discharged, 13.5% left against medical advice, 3.4% were absconded, 5.8% referred to other hospital facility (Table-IV). Total death was 8.1% (42/518). Death of Preterm neonates were more (24/42) than term (18/42), most of them were of LBW (25/42). Causes of death were perinatal asphyxia (23), prematurity (24), jaundice with kernicterus (1), congenital anomalies (1) and sepsis in 11 cases. Among neonatal death, 80.9% were of less than 1 week age, 45.2% being in their first day of life.(Table-V)

Table I: Clinical characteristics of neonates (n=518)

Characteristics	no	%
Male	292	56.4
Female	226	43.6
Term (37 week to <42 weeks)	344	66.4
Preterm (< 37 weeks)	174	33.6
Weight		
Normal weight (>2500 to < 4000)	302	58.3
LBW (<2500)		
1500 - <2500	144	27.8
VLBW (1000 – <1500)	57	11.0
ELBW (< 1000)	6	1.2
Macrosomia >4000g	9	1.7

Table II: Clinical profile of neonates at admission (no-518)

Clinical manifestation at admission	no	%
Delayed cry after birth	196	37.8
Preterm low birth weight	80	15.4
Respiratory distress	143	27.6
Meconium stain liquor	79	15.2
Poor feeding	45	8.7
Convulsion	47	9
Neonatal jaundice	43	8.3
Vomiting	28	5.4
Lethargy	29	5.6
No cry after birth	21	4
Abdominal distension	13	2.5
Congenital malformation	15	2.9
Birth trauma	12	2.3
Perinatal asphyxia with encephalopathy	11	2
fever	28	5.4
Infant of diabetic mother	9	1.7

Table III: Age of neonates at admission and duration of hospital stay (n=518)

Age	No	%
Age at admission		
24 hour or less	416	80.3
25- 72 hour	64	12.3
73 hour to 7 day	23	4.4
> 7 day	15	3.0
Duration of hospital stay		
< 3 day	223	43.1
4 -7 day	228	44.0
>7 day	67	12.9

Table IV: Outcome of study population (n= 518)

Outcome	no	%
Discharged	358	69.1
LAMA	70	13.5
Referred	30	5.8
Absconded	18	3.4
Death	42	8.1
Total	518	100

Table V: Characteristics of neonates who died (n=42)

Characteristics	no (%)	no (%)	Total
Gestational age	Term	Preterm	42 (100)
	18 (42.8)	24(57.1)	
Birth weight	Normal weight	LBW	42 (100)
	17(40.4)	25 (59.5)	
Age at admission	<24 hour	>24 hour	42 (100)
	36 (85.7)	6 (14.2)	
Causes of death			
PNA	23(54.7)		
Prematurity	24(57.1)		
Sepsis	11(26.1)		
Jaundice with kernicterus	1(2.4)		
Multiple congenital anomalies	1(2.4)		
Age at death			
	Cumulative no (%)		
1 day or less	19(45.2)		
3 day or less	24 (56.6)		
7 day or less	34 (80.9)		

Discussion

Understanding the timing and different causes of neonatal morbidities and mortality is important for identifying appropriate interventions and programme priorities to allow appropriate targeting of resources for improvement of neonatal health.

This study was carried out in a neonatal care unit (level 2) with limited facility to delineate the clinical profile at admission, common causes of morbidity and hospital outcome of 518 neonates during study period of one year.

Majority of mothers were from poor socioeconomic condition without proper antenatal checkup. Teenage mother comprised 14.3%, 48% primi, 53.7% needed caesarean section.

Out of 518, 80.3% of neonates admitted by 24 hours of age, 92.7% by 72 hours of age. This finding is higher in comparison to other studies where 62% of neonates admitted during first 24 hours of life,⁸ 79% within 72 hours.⁹ Though age at admission and morbidities depend on perinatal care, most of neonatal problem occur during first day of life.

Male preponderance of neonates (56.4%) in this study is consistent with other studies.^{8,9,10} Major causes of neonatal admission were perinatal asphyxia, preterm low birth weight and sepsis. Term and normal birth weight babies are supposed to have no or minimal minor morbidities. Higher rate of term and normal birth weight (66.4%, 58.3%) in present study reflecting inadequate care around the time of birth also reported from Nepal (65.1%, 45.6%) and India (65.8%, 49.4%).^{9,11}

Preterm neonates attributed to 33.6% of total admission, comparable with study (35%) from Nepal.⁹ The incidence varies in

countries and regions as reported lower incidence of 28.5% and higher incidence of 50% from India.^{12,13} Higher rate of Preterm birth in developing world (11.9%) than that of developed world (5-7%), emphasizes the preventive measures by proper obstetric care of mother.¹⁴

In this study LBW accounted 40% of total admission compared to even higher rate of 50.6% by Patil Ravindra et al and 47.7% by Sridhar et al.^{11,12} Study of 16290 Bangladeshi live born in rural Bangladesh reported 55.3% were of LBW.¹⁵ Global occurrence of LBW is 15.5%, of which 96.5% of them are in developing countries, and contributes to about 60 to 80% of all neonatal death.¹⁶ Low socioeconomic condition of the region might be the reason for higher rate of LBW.

Perinatal asphyxia observed in 50% (259) of admitted neonates of which 26.2% (68/259) had encephalopathy, majority (80.3%) were term. This is higher than other studies reported from Pakistan (9.1%).¹⁰ Nepal (17.6%)⁹ and India (19.5%).¹³ So adequate attention has to be paid for intrapartum monitoring and care around birth.

Diagnosis of sepsis in neonates is difficult as clinical signs and laboratory markers are often non-specific. Sepsis accounted 25.6% (133) of total admission in present study, compared to different rate of sepsis (5.1% to 50%) reported in studies of different countries.^{11,12,10,8,9}

Neonatal jaundice, a common morbidity in neonate found in 26.4% (137) of neonates with 1 mortality compared to 36.2% in one study of Pakistan,¹⁰ 7% in another study from India.¹² Monitoring of neonates at risk could avoid the severity and complications.

Hospital stay depends on morbidities encountered and quality of care among

different neonatal care unit. This Study carried out in a level 2 neonatal care unit with limited facilities where 87.1% stayed less than 7 days.

Out of 518 neonates, 358 (69.1%) were discharged with improvement, 30 (5.8%) babies were transferred to other hospital for better management not available in unit or surgical intervention, 70 (13.5%) babies left against medical advice (LAMA) and 18 (3.4%) babies absconded.

The proportion of neonatal mortality in this study during hospital stay was 8.1% (42/518). It was reported to be from 1.4% to 20.5% depending on morbidity, available facility and quality of obstetric and neonatal care in various studies.^{8,12,11,13}

Causes were perinatal asphyxia (54.7%), complications of prematurity (57.1%) and low birth weight (59.5%), sepsis (26.1%). Among the 50 countries where Neonatal mortality has been reduced significantly, of which two were of low-income countries and Bangladesh is one of them.¹⁷

More death due to early preterm and VLBW in developed countries compared to term (54%), normal birth weight (46%) in developing countries³ which is also found in present study where 42.8% (18/42) were term and 40.4% (17/42) were of normal birth weight.

LBW considered as a major determinant of perinatal survival, infant mortality and long term development especially in developing countries, contributed 40% (207) of total admission and 59.5% (25/42) of total mortality. It could be attributable to poor maternal health, low socioeconomic status and less visit to health care facility. Out of 25 LBW who died, 88% (22/25) were weighed 2 kg or less. It has been reported that among

LBW, those are more than 2 kg weight are in almost same risk or mortality as for term.¹⁸ Prematurity (24/42) accounted in majority (57.1%) of total death in this study which is higher than reported by Patil Ravindra et al (42.1%) and Ali SR et al (52.8%).^{11,19}

Out of 42 death, Perinatal asphyxia was the cause of death in 23 cases (54.7%), lower rate were found in Pakistan (39%) and India (37.1%).^{10,12} Sepsis accounted in 11 cases (26.1%) of mortality, different rates have been shown in study of Pakistan (9%), India (8.2%), 21.6%).^{10,12,13}

So, major causes of admission and mortality were perinatal asphyxia, prematurity, low birth weight, and sepsis. Similar pattern of outcome has been reported by Ali SR et al¹⁹ and ICMR Young Infant Study group.²⁰ This is also the global scenario of neonatal death in developing countries.⁵

In present majority 90.4% of death occurred during first week of life, 45.2% (19/42) within 24 hours of age, 66.6% (28/42) by 72 hours of age, the proportion is comparable with study by Belizan et al where 81% of death occurred within first week of life, more than half within 24 hours of age³. In developed countries most of neonatal death attributed to birth defect and extreme preterm low birth weight neonates, but in developing countries 85% of neonatal death due to perinatal asphyxia, prematurity, low birth weight and infection, it is 88% in Bangladesh, comparable to causes of global neonatal death.^{5,17} Study showed low cost interventions with essential newborn care training could reduce these major causes of death by 50%.²¹

Conclusion

Prematurity, low birth weight, perinatal asphyxia, sepsis were major causes for admission and also mortality in neonatal care

unit, first day of life, followed by first week of life is the most vulnerable time.

Recommendation

Optimum care should be taken during pregnancy, around the time of birth, also in first week of neonatal period to prevent, also to reduce morbidity and mortality.

References

1. Liu L, Oza S, Hogan D, Perin J et al. Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: an updated systematic analysis. *Lancet* 2015; 385: 430–40.
2. Manasyan A, Chomba E, Elizabeth M. et al. Cost-effectiveness of Essential Newborn Care Training in Urban First-Level Facilities. *Pediatrics* 2011;127(5):e1176–e1181.
3. Belizán J M, McClure E M, S Goudar S S et al. Neonatal death in Low-Middle Income Countries: A Global Network Study. *Am J Perinatol.* 2012 Sep; 29(8): 649–656.
4. Amnesty E LeFevre, a Samuel D Shillcutt, et al. Economic evaluation of neonatal care package in a cluster-randomized controlled trial in Sylhet, Bangladesh. *Bull World Health Organ* 2013; 91:736-745.
5. Lawn JE, Kinney MV, Black RE et al. Newborn survival: a multi-country analysis of a decade of change. *Health Policy Plan.* (2012) 27 (suppl 3): iii6-iii28
6. *Advances in Pediatrics* by Dutta. Page 4 Chapter 1. <https://books.google.com.bd/books>. Jaypee brothers, Medicalpublishers 2007.
7. Oeser C, Lutsar I, Metsvaht T et al. Clinical trials in neonatal sepsis. *J. Antimicrob. Chemother.* (2013).
8. Shakya A, Shrestha D, Shakya H, Shah SC, Dhakal AK. Clinical profile and outcome of neonates admitted to the Neonatal Care Unit at a teaching hospital in Lalitpur, Nepal. *Journal of Kathmandu Medical College* 2014;3(4)Issue 10:144-148.
9. Shrestha SP, Shah AK, Prajapati R, YR Sharma YR . Profile Of Neonatal Admission At Chitwan Medical College . *Journal of Chitwan Medical College* 2013; 3(6): 13-16.
10. Jan AZ, Ahmad S, Zahid SB. Clinical Audit of admission pattern and its outcome in a neonatal ICU. *Gomal J Med Sci* 2013;11:31-6.
11. Patil Ravindra B, Koppad Raghavendraswamy, Dr Benakanal Shreeshail .Clinical Profile and Outcome of Babies Admitted to Neonatal Intensive Care Unit (NICU), Mc Gann Teaching Hospital Shivamogga, Karnataka: A Longitudinal Study. *Sch. J. App. Med. Sci.*, 2014;2(6G): 3357-3360.
12. Sridhar PV, Thammanna PS, Sandeep M. Morbidity Pattern and Hospital Outcome of Neonates Admitted in a Tertiary Care Teaching Hospital, Mandya. *Intl J Sci Study* 2015;3(6): 126-129.
13. Rakholia R, Rawat V, Bano M, Singh G. Neonatal morbidity and mortality of sick newborns admitted in a teaching hospital of Uttarakhand. *CHRISMED J Health Res* 2014;1:228-34.
14. Beck S, Wojdylab D, Say L et al. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity *Bulletin of the World Health Organization* 2010;88:31-38.
15. Rolf D.W. Klemm1, Rebecca D et al. Low-birthweight rates higher among Bangladeshi neonates measured during active birth surveillance compared to national survey data. *Maternal & Child Nutrition* 2015; 11(4): 583–594.
16. Khan MW, Arbab M, Murad M et al. Study of Factors Affecting and Causing

- Low Birth Weight. *J. Sci. Res.* 2014; 6 (2), 387-394 .
17. Rubayet S, Shahidullah M, Hossain A, Corbett E et al. Newborn survival in Bangladesh: a decade of change and future implications . *Health Policy Plan.* (2012) 27 (suppl 3): iii40-iii56.
 18. Ullah A, Barman A, Haque J et al. Birthweight and early neonatal health: Bangladesh perspective. *Paediatr Perinat Epidemiol.* 2009 Nov;23(6):542-7.
 19. Ali SR, Ahmed S, Lohana H. Disease Patterns and Outcomes of Neonatal Admissions at a Secondary Care Hospital in Pakistan.. *Sultan Qaboos Univ Med J.* 2013 Aug; 13(3): 424–428.
 20. ICMR Young Infant Study Group. Age profile of neonatal deaths. *Indian Pediatr* 2008;45:991-4.
 21. Carlo WA, S. Goudar SS, Jehan I et al. Newborn Care Training and Perinatal Mortality in Communities in Developing Countries. *N Engl J Med.* 2010 Feb 18; 362(7): 614–623.